

REMARKS

Please reconsider the application in view of the above amendments and the following remarks. Applicant thanks the Examiner for carefully considering this application.

Disposition of Claims

Claims 1-12 were pending in this application. Claims 11A and 13-23 were previously canceled. New claims 24-34 are added by this amendment. Claims 1 and 27 are independent. The remaining claims depend respectively from independent claims 1 and 27. Claims 1-12 and 24-34 are pending in this application.

Claim Amendments

Claim 1 was amended by this reply to indicate the connector includes at least one liner trap and at least one trap. Claim 9 was amended by this reply to properly depend from claim 8, correcting the lack of antecedent basis for "hoop wraps." New claims 24-34 are presented. Support for these amendments can be found in claims 1-12 as originally filed and in specification paragraphs [0032]-[0035] and [0042]-[0045], at least.

Rejection(s) under 35 U.S.C. § 103

Claims 1-3 and 6-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over EP 0907049 issued to Baldwin, et al. ("Baldwin") in view of U.S. Patent No. 5,160,392 issued to Thongs, Jr. ("Thongs"). This rejection is respectfully traversed.

Independent claim 1 recites a method for making a connection for composite pipe that includes attaching a connector having at least one liner trap and at least one trap to a liner portion of a segment of composite pipe, the pipe comprising a plurality of filament fibers wound

around the liner; winding the plurality of filament fibers across the connector, wherein tension is continuously maintained on the filament fibers across the at least one trap, so that the fibers forming the outer surface of the segment of composite pipe lack a microscopic waviness; compressing the plurality of filament fibers over the at least one trap; and curing a binder which impregnates the filament fiber, wherein tension is maintained during curing.

As described in the present application, a connector is attached to a liner portion of a segment of composite pipe, where the pipe comprises a plurality of filament fibers wound around the liner. After attaching the connector to the liner, the filament fibers may be wound across the connector. Fibers that are not properly tensioned tend to exhibit a physical characteristic referred to by those having skill in the art as “microscopic waviness,” which indicates an inability to carry a sufficient load, *i.e.*, the load carried by the segment of a composite pipe (page 9, lines 28-30). Advantageously, in the connection produced by the method recited in claim 1, the fibers in the outer layer lack a microscopic waviness, thereby ensuring the outer layer’s ability to carry the required load. As noted in the present application, microscopic waviness is prevented by ensuring that, during the manufacturing of a connector, fibers forming an outer surface of a segment of a composite pipe remain wound under tension around at least one fiber trap of an end connector (page 9, lines 19-21). The Applicants’ description, starting on page 9, clearly mentions advantages of having tension maintained on the fibers during winding and resin cure. Advantageously, connectors for fiber-reinforced tube made according to Applicants’ claim 1 can have improved load bearing performance due to continuous tension being maintained on the composite fibers during manufacture. Other advantages may include reduced wall thickness of the connection.

A *prima facie* case of obviousness under § 103 requires a showing that there is a motivation or suggestion for one of ordinary skill in the art to modify or combine the references to carry out the claimed invention and that the prior art shows that one of ordinary skill in the art would have a reasonable expectation of success. *In re Vaeck*, 947 F.2d 488, 493 (Fed. Cir. 1991). The obviousness analysis does not determine whether the differences between the prior art and the claims would have been obvious; rather, it determines whether the claimed invention as a whole would have been obvious. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1537 (Fed. Cir. 1983).

In determining obviousness, prior art references *must* be considered in their entirety. *W.L. Gore Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1550 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). “The mere fact that references can be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.” *In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992). Further, a *prima facie* case of obviousness requires that all claim limitations be taught or suggested by the prior art. *See In re Royka*, 490 F.2d 981 (CCPA 1974); MPEP §§ 706.02(j), 2143.03. If even a single claim limitation is not taught or suggested by the prior art, then that claim cannot be obvious over the prior art. *Id.*

Baldwin discloses a connector for a composite pipe that is made by winding/compacting a plurality of axial reinforcement fibers between a plurality of circumferential reinforcement fibers or hoops in a traplock groove of a connector. A seal is disposed between the composite tube and the end fitting at an inboard end of the fitting (Baldwin, paragraph [0021]).

Thongs discloses a joint structure via the formation of wedge-shaped bands within circumferential grooves of a connector by alternating helix and hoop winding layers, where the hoop layers pulling the helix layers into the grooves and heating the assembly to allow impregnated resin to cure.

The Applicant respectfully submits that the Examiner has failed to meet the requirements for establishing a *prima facie* case of obviousness. Applicants' claim 1 specifically recites that the fibers are wound into the at least one trap under tension, and that this tension is maintained during resin cure. While Baldwin does disclose winding fibers into a traplock on the exterior surface of a connector, nothing in Baldwin fairly suggests, discloses, or implies winding the fibers under tension through the traplock, let alone *maintaining* this tension during resin cure, which is not even mentioned in Baldwin. Furthermore, when viewing Thongs in its entirety, it is clear that Thongs never contemplated continuously maintaining tension on the wound fibers, as Thongs specifically teaches that the fibers *may be cut* in order "to provide enough slack in the helix layers to allow them to be pulled down fully" (col. 4, lines 11-14). That Thongs suggests that the fibers should ever be cut during its method demonstrates the clear lack of motivation in Thongs for suggesting the desirability of the claimed invention as a modification of the prior art. Further, Thongs indicates that when the winding phase is completed, the assembly may be placed in a conventional oven and allowed to cure (Thongs, column 4, lines 25-29). Thus, Thongs at least implies that the fibers are necessarily truncated prior to curing, and are not maintained under tension throughout the curing process. As described above, Thongs and Baldwin, either alone or in combination, fail to disclose maintaining tension on the filament fibers throughout the process, as required by claim 1.

Additionally, Baldwin and Thongs fail to suggest attaching a connector to the liner, as required in claim 1. In Baldwin, during the fabrication of the composite tube, the liner extends some distance outboard on the exterior surface of the seal, and the liner is bonded to the seal (Baldwin, paragraph [0032]). Whereas Applicant attaches the connector to the liner, Baldwin discloses bonding the liner to the seal, not to the connector. In Thongs, the connector is abutted against a conventional mandrel and held in place by friction so as to permit its being integrated into a filament wound structure (Thongs, column 2, lines 2-6). Thongs is silent with respect to attaching a connector to a liner portion of a composite pipe. In contrast to Thongs and Baldwin, claim 1 recites that the connector is attached to a liner portion of a composite pipe, such as by winding hoop wraps over the liner, among other steps (Applicant's specification, paragraph [0032]). Thus, Baldwin and Thongs, alone or in combination, fail to teach, suggest, or disclose attaching a connector to the liner, as required in claim 1.

Thus, in the present case, the Examiner has failed to demonstrate that all claim limitations of independent claim 1, specifically, the continuous maintenance of tension on the fibers and the attaching of the liner to the connector, are taught or suggested by Baldwin and Thongs. Moreover, Baldwin and Thongs fail to suggest the requisite desirability of the claimed invention as a modification of the prior art.

In view of the above, Baldwin and Thongs, whether considered separately or in combination, fail to show or suggest the present invention as recited in claim 1. Thus, claim 1 is patentable over Baldwin and Thongs. Dependent claims are also patentable for at least the same reasons. Accordingly, withdrawal of the rejection is respectfully requested.

Claim 4 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Baldwin and Thongs in further view of either U.S. Patent No. 4,695,341 issued to Matuska, et al.

("Matuska") or U.S. Patent No. 4,963,210 issued to Corr, et al. ("Corr"). This rejection is respectfully traversed.

As discussed above, Baldwin and Thongs neither show nor suggest the present invention as recited in claim 1. Matuska and Corr, which the Examiner only asserts as showing fibers wound with a negative coefficient of thermal expansion, do not provide that which Baldwin and Thongs lack, with respect to claim 1.

In view of the above, Baldwin, Thongs, and Matuska or Corr, whether considered separately or in combination, fail to show or suggest the present invention as recited in claim 1. Thus, claim 1 is patentable over Baldwin, Thongs, and Matuska or Corr. Dependent claims are also patentable for at least the same reasons. Accordingly, withdrawal of the rejection is respectfully requested.

Claim 5 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Baldwin and Thongs in further view of U.S. Patent No. 6,379,763 issued to Fillman ("Fillman"). This rejection is respectfully traversed.

As discussed above, Baldwin and Thongs neither show nor suggest the present invention as recited in claim 1. Fillman, which the Examiner only asserts as showing the use of a heat shrink tape to not only cure a material but also for consolidating and retaining the resin in the assembly, does not provide that which Baldwin and Thongs lack with respect to claim 1.

In view of the above, Baldwin, Thongs, and Fillman, whether considered separately or in combination, fail to show or suggest the present invention as recited in claim 1. Thus, claim 1 is patentable over Baldwin, Thongs, and Fillman. Dependent claims are also

patentable for at least the same reasons. Accordingly, withdrawal of the rejection is respectfully requested.

With regard to new claim 24, neither Thongs nor Baldwin discloses attaching a connector to a liner, as required in claim 1. Further, neither Thongs nor Baldwin discloses the steps of heating, inserting, cooling, winding hoop wraps, and curing to attach the connector to the liner, as recited in new claim 24. Thus, new claim 24 is patentable over Thongs and Baldwin, and allowance of new claim 24 is respectfully requested.

Regarding new claim 25, Baldwin teaches away from the use of o-rings. Specifically, Baldwin indicates that o-ring seals are not feasible due to the composite tube manufacturing process (Baldwin, paragraph [0010]). In lieu of an o-ring seal, Baldwin provides an elastomeric seal between the inboard end of the fitting and the inside of the filament composite tube (Baldwin, paragraph [0018]). In contrast, Applicant's method allows for the incorporation of an o-ring to seal the fitting and composite pipe (Applicant's specification, paragraph [0032] and Figure 4). Accordingly, allowance of new claim 25 is respectfully requested.

Regarding new claim 26, as discussed above, Thongs at least impliedly indicates that the filament fibers are truncated prior to curing. Thus, claim 26 is patentable over Baldwin in view of Thongs. Accordingly, allowance of new claim 26 is respectfully requested.

Regarding new claims 27-34, in addition to failing to disclose attaching a connector to the liner and failing to disclose maintaining tension through the curing step, Baldwin and Thongs do not indicate that the filament fibers are tensioned using a tensioning ring. Claims dependent from claim 27 are patentable for at least the same reasons as discussed above with

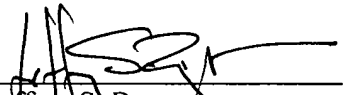
respect to claim 1 and claims dependent from claim 1. Accordingly, allowance of claims 27-34 is respectfully requested.

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 50-0591, under Order No. 17193/002003 from which the undersigned is authorized to draw.

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Respectfully submitted,

By


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Attachments